

## REMARKS/ARGUMENTS

In the Office Action dated March 3, 2006, the Examiner rejected claims 1-10, 12-15, 21-28, and 31-37; claims 11, 16, 29, and 38 were withdrawn from consideration pursuant to Examiner's restriction; and claims 17-20, 30, 39, and 40 were objected to as reciting allowable subject matter but depending from a rejected base claim. Claims 1-40 remain pending in the application. Reconsideration and allowance of all pending claims are requested.

### Information Disclosure Statement

Applicants submit attached hereto a Supplemental Information Disclosure Statement containing 2 references recently cited in a communication from the European Patent Office. Applicants note that both references are coded category "A," meaning the European Examiner considered the cited references to serve only as technical background for Applicants' claimed invention.

### Claim Rejections under 35 USC 103

Claims 1-3, 6, 8, 9, 21, 22, 26 and 27 are rejected under 35 U.S.C. §103(a) as being obvious over WO 00/37241, to Wilson. The rejection is respectfully traversed.

The Wilson application ("Wilson") relates to a method for producing articles composed of a thermoplastic polymer reinforced with nanoparticles. In the method, the polymer/nanoparticle combination is melted and the molten material is solidified in a rotating mold cavity (Abstract).

The application does not mention a convection vortex causing the ejection of the molten composite material from the container. The Office action states that, although the reference does not use the term "convection vortex", rotation of the molten material in the mold cavity in the Wilson method would result in convection and in creating a vortex, and holds this to be equivalent to creating a convection vortex. Even if this were to be accepted as true, the failure of Wilson to describe or suggest the ejection of molten composite material by the vortex results in a failure of this reference to teach, suggest, or disclose all elements of Applicants' claims rejected under this reference. Indeed, as Wilson describes a method whereby the molten material is solidified within the rotating

mold, it is clear that ejection of molten material from the mold would be an undesirable result for Wilson's process, because any ejected material would be unavailable for solidification in the rotating mold. As a result of this teaching away from Applicants' method as recited in the rejected claims, Applicants submit that a prima facie case of obviousness has not been established with respect to the WO 00/37241 application. It is believed that the rejection is hereby overcome.

Claims 1-10, 12-15, 21-28 and 31-37 are rejected under 35 U.S.C. §103(a) as being obvious over US 6,251,159, to Angeliu. The rejection is respectfully traversed.

The Angeliu '159 patent relates to methods for dispersion strengthening of metallic melts by adding nanophase particles to the melt and dispersing the particles so that they are spaced from each other at a distance that provides dispersion strengthening (Abstract, claim 1). Dispersion of the particles is accomplished by "convection mixing from the heat of the metallic melt" (col. 4, lines 50-51) or by "an appropriate mixing device, such as a stirrer, electromagnetic mixing, forcing gas mixing, or physical mixing devices" (col. 4, lines 52-55). The patent does not mention rotating the mixture to create a vortex or using the vortex to eject the molten material from the container.

As argued for the Wilson reference, above, Applicants respectfully submit that there is no teaching, suggestion, or disclosure of a vortex that ejects molten material from a container holding the melt. Although Angeliu '159 does not specify rotation of the melt container to cause the convection vortex, the Examiner asserts that Angeliu '159 indicates the manner of mixing is not critical and may include any of the methods set forth in the above quotation of col. 4, lines 52-55; it is in this passage where the Examiner appears to find a suggestion of rotating the container. However, even if this were taken to be true, Angeliu '159 remains deficient because of its failure to fairly suggest or even mention the notion of the rotation, or any other mixing action, causing the ejection of molten material from the container. Angeliu '159 merely notes that the melt may be used to make "large castings" (col. 5, lines 21-32). There is no mention of how these large castings are formed other than to say they may be formed by "solidifying, forging, working, and other metallurgical processes;" certainly there is nothing in the description to suggest the molten material is ejected from the container by the rotation of the container, or by any of the other means Angeliu '159 describes as

being useful for agitating the melt. Applicants' claims clearly recite that the ejection of the molten material is caused by the convection vortex created in the melt, and the required suggestion of such a limitation is entirely absent from Angeliu '159. As a result, Applicants submit that a prima facie case of obviousness has not been established with respect to the Angeliu '159 reference. It is believed that the rejection is hereby overcome.

Claims 1-10, 12-15, 21-28 and 31-37 are rejected for nonstatutory obviousness-type double patenting over claims 1-30 of US 6,939,388 to Angeliu. The rejection is respectfully traversed.


The claims of the Angeliu '388 patent relate to methods for forming a nanocomposite material by dispersing a nano-sized material in a molten material using ultrasonic energy and solidifying the molten material (claim 1). The Office action admits that the claims do not recite a convection vortex but asserts that it would have been obvious to employ a convection vortex in view of the teaching in the Angeliu '159 patent that convection mixing or electromagnetic mixing may be used to disperse nanoparticles in a metallic melt.

The '388 patent has the same deficiency as prior art against Applicants' claims as has been noted for '159: there is not the least suggestion of a vortex that causes the molten material to be ejected from the melt. The shortcomings of '159 on this matter have been addressed above. The '388 patent claims 1-30 say nothing about ejecting molten material from the melt, and therefore these claims do not disclose or suggest a vortex that ejects the molten material. In the '388 claims, the melt is merely recited to be solidified, and in certain claims (e.g., claim 18) this solidification is recited to be via directional solidification or by single crystal solidification. On the contrary, directional solidification and single crystal solidification generally require highly controlled processes to solidify the melt to form material having the desired microstructure. Nothing in any of these claims suggests ejection of molten material from a container using a vortex. As a result, Applicants submit that a prima facie case of obviousness has not been established with respect to the Angeliu '388 reference. It is believed that the rejection is hereby overcome.

Claims 17-20, 30, 39, and 40 were objected to as reciting allowable subject matter but depending from a rejected base claim. Applicants gratefully acknowledge these remarks indicating allowable subject matter. Moreover, Applicants respectfully submit that the base claim rejections have been overcome by the arguments presented above. For these reasons, Applicants respectfully submit that the objection to these claims should be removed.

In view of the foregoing arguments, the Applicants respectfully request reconsideration and prompt allowance of all pending claims 1-27. If the Examiner believes that a telephonic interview will help speed this application towards issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

  
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Attachment: Supplemental IDS